

PATENT SPECIFICATION

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(54) PLANT CONTAINERS

(71) I, GEOFFREY JOHN HARRISON, a British subject, of 7 Cloughside, Marple Bridge, Cheshire, do hereby declare the invention, for which I pray that a Patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:-

The present invention relates to humidifying devices and is particularly concerned with containers for germinating seeds and growing plants. The plants may be in earth in pots having holes in the bottom, which pots are placed on a supporting platform in the container.

Such containers may be provided with a reservoir of water and with an automatic system for passing water from the reservoir to the roots.

It is important in such devices that a continuous flow of water is provided from a reservoir which can contain enough water to avoid frequent re-filling. It is also important that the flow should not be so great that it floods the roots.

One method of passing water from a reservoir to the roots of plants situated above the reservoir is by means of a strip of material having capillary properties, a part of which material extends below the surface of the water. One such material is fabric made from a vegetable fibre. This material contaminates the water and damages the growing plants. Furthermore, the capillary properties of such fabrics are such that water can only be raised a short distance in height, and also only a short distance in a lateral direction on the support means. Therefore the capacity of the reservoir in such devices is small, necessitating frequent re-filling, and the number of plants which can be grown in each device is small.

The present invention aims to overcome the above-mentioned disadvantages.

According to the invention, there is provided a container having a support means, a

reservoir situated directly below such support means, and a mat of capillary material laid on the support means to substantially completely cover the support means and having at least one portion extending into the reservoir, wherein the support means takes the form of a shelf or tray adapted to support a number of plant pots with the mat interposed between the base of the or each plant pot and the shelf or tray.

Preferably, the capillary mat of the present invention is a melded fabric mat made from synthetic fibres, which may be polyester but are preferably nylon. Preferably the mat has a thickness of between two and three millimetres and has a weight of between 65 gms. per square metre and 150 gms. per square metre. A suitable mat is that sold by I.C.I. Limited under the Trade Mark CAMBRELLE which has a thickness of 2.5 mm. and weight of 70 gms. per square metre.

According to one embodiment of the invention, the reservoir is provided with a side wall having a flange adapted to receive the edge of said shelf or tray, said shelf or tray being provided with at least one cut-away portion to permit the said portion(s) of the mat to extend into the reservoir. The support means may comprise a solid shelf or a shelf in the form of a grill having a plurality of bars.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is an exploded perspective view of one embodiment of a container according to the invention;

Figure 2 is a vertical section through a container assembled from the components shown in Figure 1;

Figure 3 is a plan view of a reservoir forming part of a second embodiment of a container according to the invention;

Figure 4 is a section taken on the line IV-IV in Figure 3;

Figure 5 is a plan view of a tray or shelf for

use with the reservoir shown in Figures 3 and 4;

Figure 6 is a vertical section through a detachable side wall for the reservoir shown in Figures 3 and 4;

Figure 7 is a plan view of a third embodiment of a container according to the invention; and

Figure 8 is a section taken on the line VIII-VIII in Figure 7;

Reference will first be made to Figures 1 and 2 of the drawings in which the container comprises a reservoir 1 having a flange 2 for supporting a tray or shelf 4 and an upwardly extending side wall 3. The tray or shelf 4 constitutes support means on which is laid a mat 5 of capillary material such as nylon. The corner regions of the shelf 4 are cut-away to provide recesses 6 and the mat 5 which is shaped to cover substantially the whole of the shelf 4, has outwardly extending arm portions or ears 7 at the corner regions which, when the container is assembled as shown in Figure 2, pass through the recesses 6 and into the reservoir 1 which is normally filled with water 8 so that the arm portions 7 dip into the water. The arm portions 7 preferably extend substantially to the bottom of the reservoir.

The reservoir 1 has a central protrusion 9 for supporting the shelf at its centre and from below and the shelf 4 is preferably provided on at least its upper surface with a series of ribs 10 to permit surplus water to drain away from the capillary mat 5.

Three plant pots containing plants can be placed on the capillary mat 5 on the shelf 4 of the container. The central protrusion 9 in this case serves to support the central region of the shelf while its edges bear on the flange 2. The plants should obtain sufficient and not too much water through the capillary mat and through the holes in the bottom of the plant pots for so long as water remains in the reservoir and in the mat.

Turning now to Figures 3 to 6 of the drawings, it will be seen that the container comprises a substantially rectangular reservoir 11 having a flange 12 for supporting the edge of a tray or shelf 14 and two protrusions 19 for supporting central regions of the tray or shelf 14. The shelf is provided with a cut-out region 16 along one of its longer sides to permit a flap indicated by the dotted line 17 in Figure 5 of a capillary mat to enter the reservoir 11 beneath the shelf 14 which shelf forms a support for the remainder of the capillary mat (not shown) which has like dimensions to that of the shelf 14.

The reservoir 11 is provided with an outwardly extending flange 18 for supporting the bottom of a detachable side wall 13 (Figure 6) of the container. A number of plant pots can be placed on the capillary mat as in the embodiment described with reference to Figures 1 and 2. If desired, the reservoir 1

shown in Figures 1 and 2 may also be provided with a detachable side wall similar to the side wall 13.

The container shown in Figures 7 and 8 of the drawings comprises a substantially rectangular reservoir 21 having side walls 23 and end walls 28. In this case, the central protrusions take the form of a series of ribs 29 extending along the longitudinal axis of the reservoir and the upper edges of the side walls 23 are extended outwardly to form platforms 30 which terminate in side walls 31 which are joined to the end walls 28. Each side wall 23 is provided with a step which forms a flange 22 on which a substantially rectangular tray or shelf 24 can rest. The tray or shelf has such a thickness that, when it is supported on the flanges 22, its upper surface is substantially co-planar with the upper surfaces of the platforms 30. Two capillary mats 25a and 25b are laid on the platforms 30, the mats extending between the shelf 24 and a side wall 23 into the reservoir 21 and one mat 25a also overlying the shelf 24. For the sake of clarity the shelf and mats are omitted from Figure 7.

Each end wall 28 of the reservoir 21 is provided with a cut-out recess 26 by means of which the shelf 24 may be removed from the reservoir by engaging the underside of the shelf at one or both ends and raising the shelf. However, it is not necessary to raise the shelf in order to fill the reservoir with water because water can be poured into the reservoir through the recesses 26. Each end wall 28 is also provided with a bore 32 which is in communication with the interior of the reservoir by means of a slot 33 and serves to indicate the level of water and in the reservoir.

The reservoir 21 is further provided with bores 34 at its corners in the end walls 28 and bores 35 provided in thickened regions 36 of the side walls 31. The bores 34 and 35 serve for the reception of rods by means of which a series of these containers may be stacked one on top of another for display purposes. The reservoir may further be provided with a detachable side wall (not shown).

The embodiments of container above described can be made in various different shapes and sizes to accommodate different numbers and sizes of plant pots. The reservoir and support means can, in each case, be made of moulded plastics or ceramic material.

In the containers according to the present invention, the reservoirs may be such that the level of water is five inches below the support means before the reservoir need be re-filled to maintain the flow of water. Also, in the containers according to the present invention the horizontal flow of water through the capillary mat may be three or even four metres. The support means may therefore be

at least three or four metres in length.

A further advantage of the containers according to the present invention is that if the roots of the plants are over-watered, then the water flows back through the capillary mat into the reservoir.

Where the plants are growing in plant pots, particularly clay pots, it has been found useful to insert one end of a small piece of capillary matting through the holes in the bottom of the pots, the other end being placed in contact with the capillary mat laid on the support means, since this further improves the flow of water to the plant roots.

Containers made according to the present invention may be used for other purposes than watering plants. For example, they may be used in the manufacture of pottery. In this case, the capillary mat is skimmed with plaster of Paris or like material which provides a flat surface on which pottery may be placed. The capillary mat prevents the pottery from drying out prior to the clay being baked.

WHAT I CLAIM IS:-

1. A container having a support means, a reservoir situated directly below the support means and a mat of capillary material laid on the support means to substantially completely cover the support means and having at least one portion extending into the reservoir, wherein the support means takes the form of a shelf or tray adapted to support a number of plant pots with the mat interposed between the base of the or each plant pot and the shelf or tray.

2. A container according to claim 1, wherein the capillary mat comprises a melded fabric mat made from synthetic fibres.

3. A container according to claim 2, wherein the fibres are polyester fibres.

4. A container according to claim 2, wherein the fibres are made of nylon.

5. A container according to any one of claims 2 to 4, wherein the mat has a thickness of between two and three millimetres and a weight of between 65 and 150 gms. per square metre.

6. A container according to any preceding claim, wherein the reservoir is provided with a side wall having a flange adapted to receive the edge of said shelf or tray, said shelf or tray being provided with at least one cut-away portion to permit the said portion(s) of the mat to extend into the reservoir.

7. A container according to claim 6, wherein the support means comprises a solid shelf provided with a series of ribs.

8. A container according to claim 6, wherein the support means comprises a shelf in the form of a grill having a plurality of bars.

9. A container according to any one of claims 6 to 8, wherein the reservoir is provided with one or more protrusions for sup-

porting the shelf or tray.

10. A container according to any one of claims 6 to 9, wherein the shelf or tray is provided with a plurality of cut-away portions and wherein the capillary mat is provided with a plurality of portions to extend into the reservoir corresponding to the number of cut-away portions of the tray or shelf.

11. A container according to claim 10, wherein each of said mat portions extending into the reservoir comprises an ear projecting from the major portion of the mat.

12. A container according to any one of claims 6 to 11, wherein the reservoir is provided with a further side wall adapted to be detachably mounted on said side wall.

13. A container according to any one of claims 6 to 12, wherein the support means further includes laterally extending portions of said side walls of the reservoir which form platforms arranged to be substantially coplanar with the upper surface of said shelf or tray.

14. A container according to claim 13, wherein the reservoir is substantially rectangular and the platforms extend only along its longer sides.

15. A container according to claim 14, wherein two capillary mats are provided, one mat being arranged to be laid on the shelf or tray and one of the platforms and the other being arranged to be laid on the other platform.

16. A container according to any one of claims 13 to 15, wherein the reservoir is provided with at least one recess in its side wall to facilitate removal of the shelf or tray.

17. A container according to any one of claims 13 to 16, wherein the reservoir is provided with means in its side wall to permit said reservoir to be filled with water without removing the shelf or tray.

18. A container according to any one of claims 13 to 17, wherein the reservoir is provided with means to enable a second container to be stacked on top of said container.

19. A container according to any preceding claim, wherein the reservoir and support means are made of moulded plastics or ceramic material.

20. A container substantially as described herein with reference to Figures 1 and 2 of the drawings.

21. A container substantially as described herein with reference to Figures 3 to 6 or Figures 7 and 8 of the drawings.

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COMPLETE SPECIFICATION

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Sheet 1

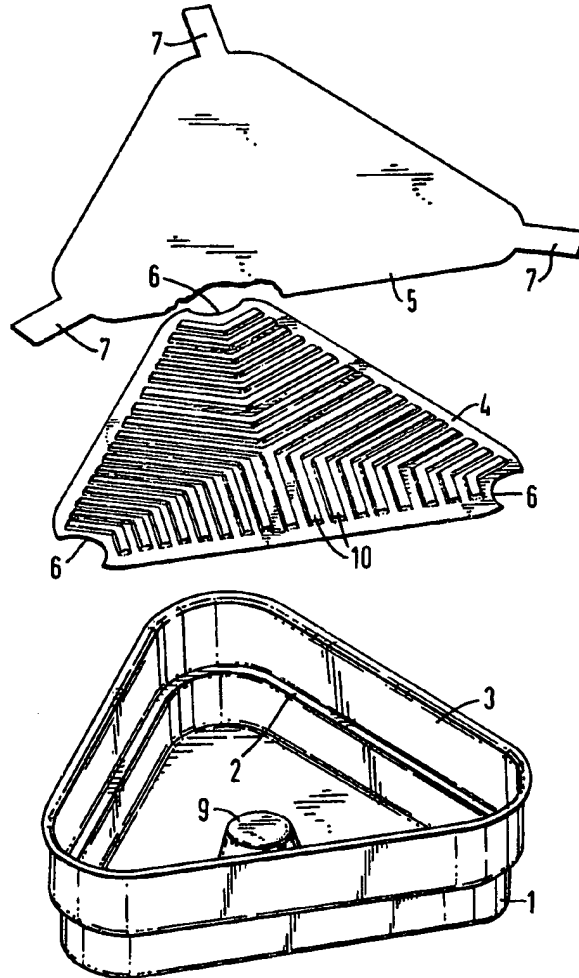


FIG. 1

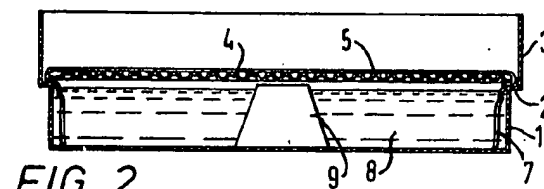


FIG. 2

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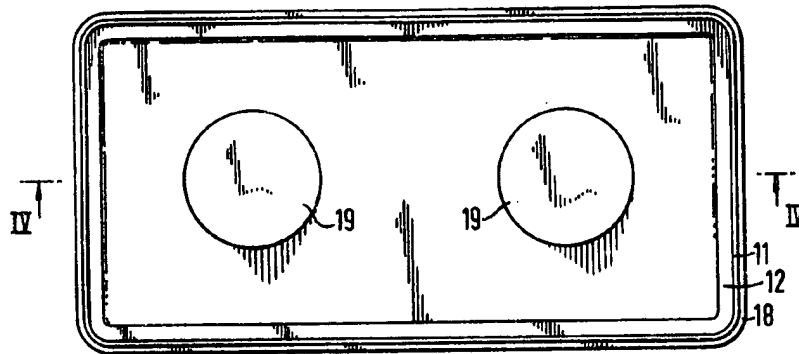


FIG. 3

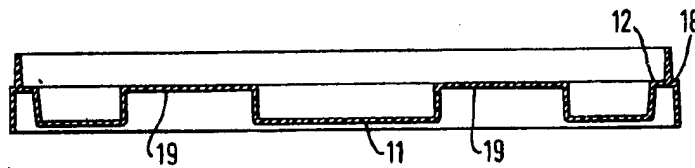


FIG. 4

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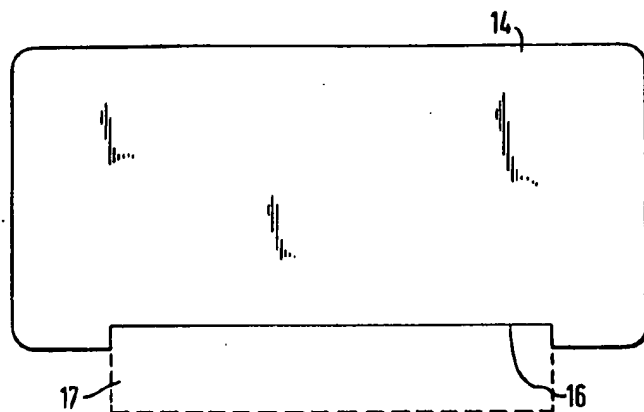


FIG. 5

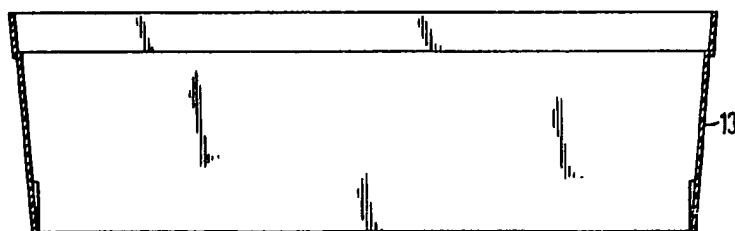


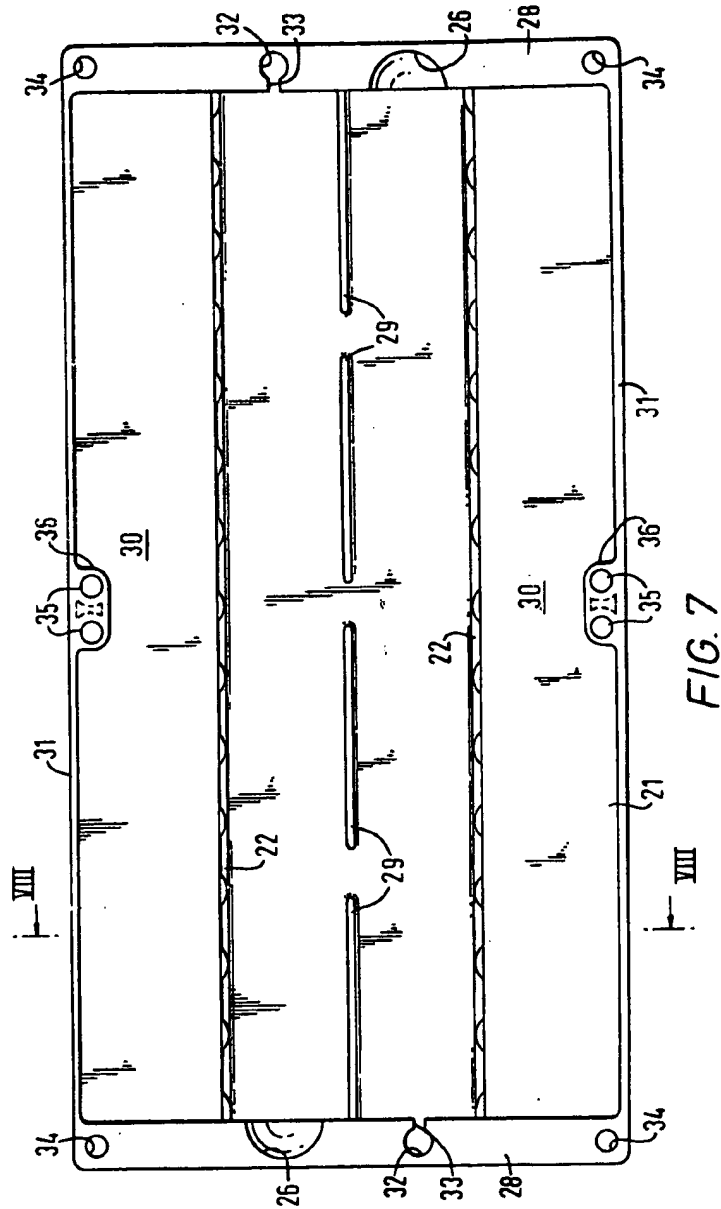
FIG. 6

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Sheet 5

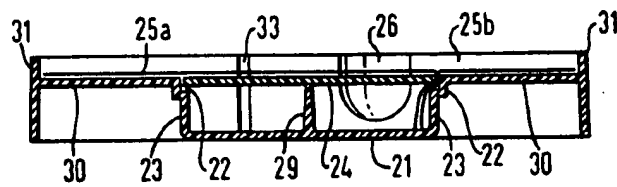


FIG. 8

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A1E EAE EE2 EK1B EK22 EK26

(56) Documents Cited

GB 2018117 A	GB 1556580 A	GB 1098067 A
US 5189834 A	US 4807394 A	US 4343109 A
US 4299056 A	US 4287682 A	

(58) Field of Search

UK CL (Edition M) A1E EAE
INT CL⁵ A01G 27/00

(54) Semi-automatic watering system for domestic pot plants

(57) A rigid reservoir 2 holds water which is drawn up wick(s) 3 to a layer of capillary material 5 placed on the upper surface of lid 4 of the reservoir. One or more plant pots are placed on the capillary material so that they take up water through the pot's drainage holes 10 by capillary action. The device is of such a size that it may be used in a domestic situation, typically on a window sill or a table top.

Lid 4 may be detachable or integral with reservoir body.

Lid 4 has recessed area (8, Fig. 3).

A thin perforated waterproof membrane 12 on material 5 reduces evaporation.

Reservoir 2 has filler hole 1 and floating level indicator 7.

Fig. 1

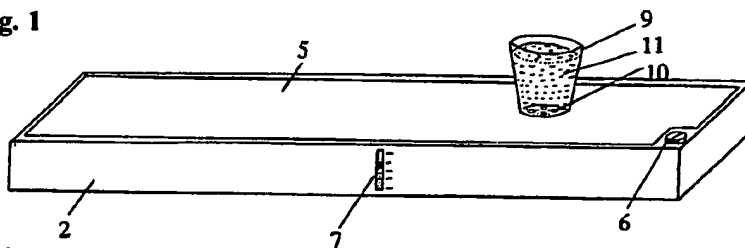
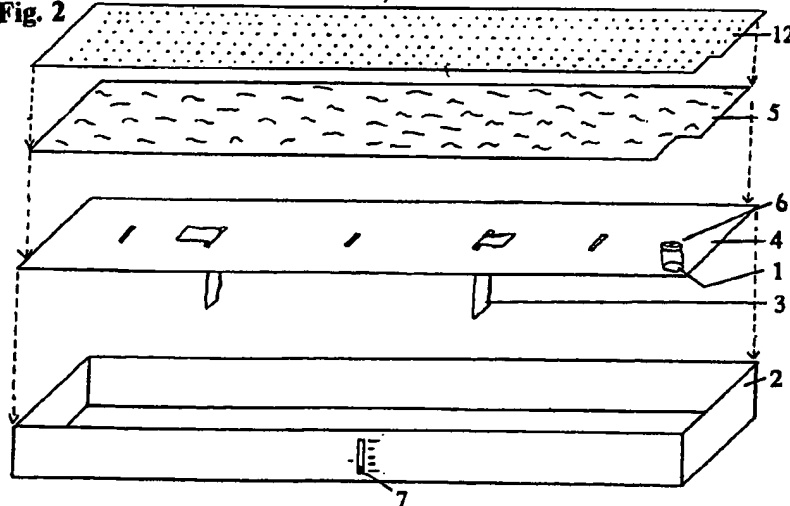


Fig. 2



The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

SEMI-AUTOMATIC WATERING SYSTEM FOR DOMESTIC POT PLANTS

Fig. 1

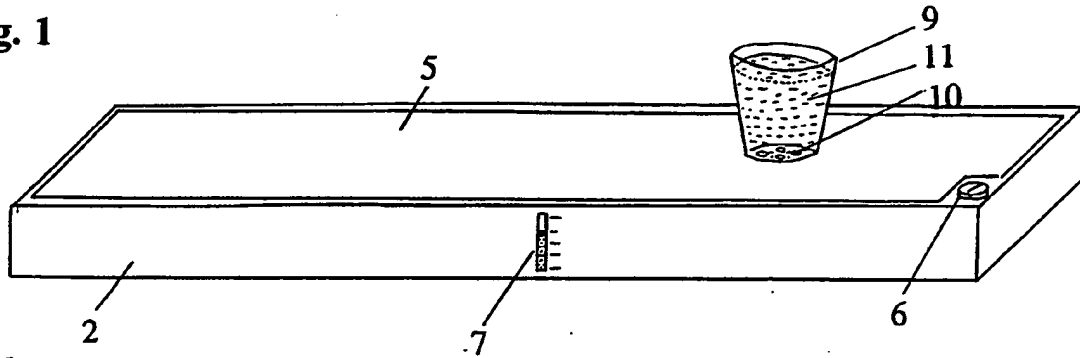


Fig. 2

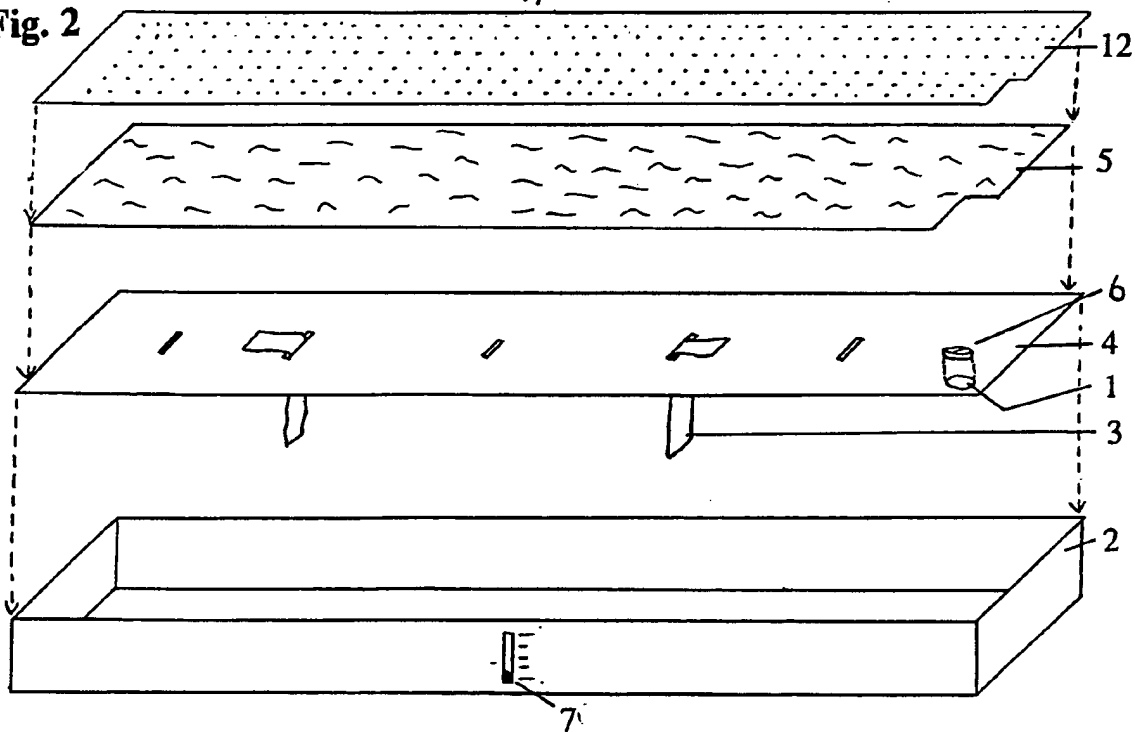
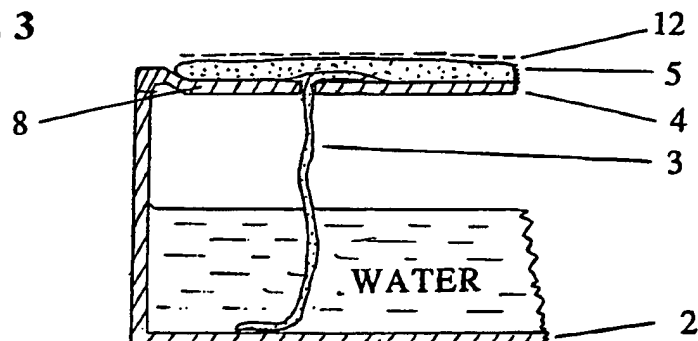


Fig. 3



SEMI-AUTOMATIC WATERING SYSTEM FOR DOMESTIC POT PLANTS

This invention relates to a semi-automatic method of watering domestic plants growing in plant pots, by capillary irrigation.

Capillary irrigation methods are widely used in commercial horticulture for the production of pot plants. This is usually done by supplying water to the surface of a large glasshouse bench which is covered with some form of capillary material (capillary matting), such that capillary action causes the water to spread sideways over the bench, then up into the compost of the plant pot through the drainage holes in the base of the pot.

Similar principles are applied in some irrigation systems used by commercial interior landscapers for individual plants or groups of plants growing in a large container (typically greater than 35cm diameter), whereby water is held in a reservoir beneath or within the growing medium in which the plant is growing: a reservoir is placed in the growing container (or it may be integral with the container) and covered with compost such that water is drawn into the compost from the reservoir by capillarity up some form of wick. This provides the plant with water over a period of time, typically 2 to 3 weeks.

Various types of self watering container as described above, are now available on the retail market for growing relatively large individual plants. These containers have the advantage of regulating the water supply to the plant thus reducing the incidence of over or under watering and also reducing the frequency of watering so that the plants may be left for longer periods without needing attention. For this reason, these "self watering containers" may be called "semi-automatic" watering systems.

However, none of the above watering systems cater for plants growing in small plant pots (typically 6cm to 15cm diameter) as sold by retailers and used in the home, so the consumer does not as yet have access to any form of semi-automatic watering system capable of providing a regulated supply of water to pot plants over a period of time.

According to the present invention, a semi-automatic watering system for domestic plants growing in plant pots is provided comprising a rigid reservoir capable of holding water and supporting the weight of one or more pot plants, one or more capillary wicks which conduct water held in the reservoir to the upper surface of the reservoir and a layer of capillary material on the upper surface of the reservoir, such that one or more potted plants may be placed on top of the reservoir with the compost in contact with the capillary material, such that the plants receive a regulated supply of water over a period of time.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawing in which:-

Figure 1 shows in perspective view the general appearance of the system;

Figure 2 shows in exploded perspective view suitable components for the system;

Figure 3 shows a partial vertical section of the system in operation.

Referring to the drawings the watering system comprises a moulded plastics reservoir 2, a lid 4 through which one or more suitable wicks of capillary material 3 (for example of horticultural capillary matting) may be passed. The wicks reach to the base of the reservoir and connect with a layer of capillary material 5 (e.g. horticultural capillary matting) placed on the lid in a major recessed area 8 of the lid as shows in Fig.3.

The reservoir is filled with water through an appropriate filler hole 1. Observation of the water level is made using an appropriate floating water level indicator 7 such as a floating ball held in a translucent window. When full, the filler hole is then blocked with a plug 6. This plug may need a small hole (not shown) to allow the ingress of air into the reservoir as water is drawn out.

The lid 4 may be detachable or else integrally formed with the main body 2.

Water is drawn up the capillary wick(s) and wets the capillary material 5. Pot plants 9 placed on the capillary material 5 are thus watered by capillary action, taking up water through the drainage holes 10 in the base of their pots where the compost 11 is in contact with the wet capillary material. As water in the reservoir is used up the water level indicator drops, until it reaches an appropriately low level, at which point the reservoir is refilled with water as described above.

The recessed area 8 of the lid allows excess water from the plant pots to collect and drain by gravity through the holes in the lid and into the reservoir 2, should the pot plants ever be watered to excess from above.

A thin perforated waterproof membrane 12, (e.g. of thin plastic) may be placed on the upper surface of the capillary material, to reduce evaporation from the capillary material between adjacent pots and to assist in keeping the surface clean.

The watering system may be constructed in any appropriate shape or size, using any suitable waterproof material, such that one reservoir may be used for one pot of a suitable size and shape, or several pot plants may be irrigated on one reservoir, for instance in a row on a window sill or in a group on a table top.

The watering system may be constructed with any form of ornamentation, in order to make the invention match the colour and style of the pots and to make it attractive to the customer. In this way the watering system may also function as an attractive plant pot stand.

Typical dimensions of the reservoir 2 are 60cm x 15cm x 6cm, but a preferred range of lengths would be 30cm to 100cm and widths would be 10cm to 50cm and depths 4 cm to 10 cm. The dimensions of circular reservoirs would typically be 6cm to 35cm diameter and 4cm to 10cm deep.

CLAIMS

1. A semi-automatic watering system for domestic plants growing in plant pots, comprising a rigid reservoir capable of holding water and supporting the weight of one or more pot plants, one or more capillary wicks which conduct water held in the reservoir to the upper surface of the reservoir and a layer of capillary material on the upper surface of the reservoir, such that one or more potted plants may be placed on top of the reservoir with the compost in contact with the capillary material, such that the plants receive a regulated supply of water over a period of time.
2. A semi-automatic watering system as claimed in Claim 1 wherein the water level in the reservoir may be observed through some appropriate window, or by using some appropriate flotation device to provide a water level indicator.
3. A semi-automatic watering system as claimed in Claim 1 or Claim 2, wherein the capillary material on the upper surface is covered with a suitable perforated waterproof material, in order to reduce water evaporation from the capillary material between adjacent pot plants and to assist in keeping the surface clean.
4. A semi-automatic watering system as claimed in Claim 1, Claim 2 or Claim 3 wherein the upper surface of the reservoir has a recessed area such that any excess water in the plant pots may collect in the recess and drain by gravity through the holes in the upper surface and into the reservoir.
5. A semi-automatic watering system as claimed in Claims 1, 2, 3 or 4 wherein the reservoir is constructed in a range of shapes and sizes appropriate for either individual pots of different sizes, or for groups of pot plants.
6. A semi-automatic watering system as claimed in Claim 1, Claim 2, Claim 3 or Claim 4 wherein the reservoir is constructed with ornamentation, such that the watering system acts also as an attractive pot stand.
7. A semi-automatic watering system as claimed in Claims 1, 2, 3, 4 or 5, wherein the upper surface of the reservoir is integral with the main body of the reservoir and not constructed as a detachable lid.
8. A semi-automatic watering system substantially as described herein with reference to Figures 1 to 3.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

4

Application number
GB 9317485.2

Relevant Technical Fields

- (i) UK Cl (Ed.M) A1E (EAE)
(ii) Int Cl (Ed.5) A01G 27/00

Search Examiner
J M WORVELL

Date of completion of Search
14 APRIL 1994

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-
1-8

(ii)

Categories of documents

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| <p>X: Document indicating lack of novelty or of inventive step.</p> <p>Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.</p> <p>A: Document indicating technological background and/or state of the art.</p> | <p>P: Document published on or after the declared priority date but before the filing date of the present application.</p> <p>E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.</p> <p>&: Member of the same patent family; corresponding document.</p> |
|--|---|

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2018117 A	(MARRISON)	1,2 at least
X	GB 1556580	(SPENCER)	1 at least
X	GB 1098067	(BAÇKX)	1,2 at least
X	US 5189834	(GREEN)	1 at least
X	US 4807394	(LYON)	1,4 at least
X	US 4343109	(HOLTKAMP)	1 at least
X	US 4299056	(TOWNING)	1,3,7 at least
X	US 4287682	(BROWNG)	1,4,5,6 at least

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